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The proceedings of a conference called to institute a dialogue between the architectural and educational professions are summarized. Areas considered include deterrents to efficient dialogue, the need for research, parameters of research (foundational questions; flexibility; furniture, materials, hardware, and teaching equipment; information transmission), 23 suggested educational needs of exceptional children with as many suggested architectural solutions, and building designs for these children following and resulting from the conference. (Author/JD)

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Research Conference

AN ARCHITECTURAL-EDUCATIONAL INVESTIGATION OF EDUCATION AND TRAINING FACILITIES FOR EXCEPTIONAL CHILDREN

I. Conference Background

On September 9 and 10, 1965, The Council for Exceptional Children, NEA, sponsored a research conference titled "An Architectural-Educational Investigation of Education and Training Facilities for Exceptional Children." This conference was a culmination of considerable planning by the Executive Committee of The Council for Exceptional Children and Mr. Bertram Berenson, Chairman of the Department of Architecture, Hampton Institute, Hampton, Virginia. The purpose of the conference was to effect the beginning of a continuing dialogue between the architectural and the educational professions. The four major deficits under consideration were intellectual, neurological, communication, and behavioral; and within each one of these, sub-categories of impairments were described by both the participants and invited observers.

This paper is an attempt to summarize the ensuing dialogue of the conference. It was obtained from the tapes of the conference and can by no means be considered comprehensive. Because of the rapid exchange of ideas and the "brain-storming" format of the dialogue, valuable ideas may be lost to posterity save for the relistening to the tapes of the conference. Such tapes will remain available at The Council for Exceptional Children headquarters in the NEA building, Washington, D.C., for students of architectural and educational innovations.

As may be expected from the heterogeneity of the participants, diverse and divergent avenues of discussion occurred. Different "schools" emerged with regards to educational objectives, goals, and particularly, methodology. An almost universal lack of specific delineation of disability areas was encountered, leading to pervading confusion of stable educational objectives. Predetermined parameters of architectural and educational dimensions were found so inadequate as to prevent their utilization in considering innovative educational changes. Consequently, although the attached agenda (Appendix B) was adhered to, it cannot be considered conclusive or even comprehensive to the total scope of the dialogue.

II. Deterrents to Efficient Architectural-Educational Dialogue

The need for architectural and educational dialogue might seem obvious. New schools have to be built, and architects must design them. One might suspect, then, that it is the architect who must assume the major burden for information concerning the newest trends of special education. However, these assumptions can only lead to superficiality of thought. The building of facilities for special education must, in fact, be the result of a continuing effort at communication between educator and an architect. The educator may use architectural technology to innovate; and the architect must have knowledge of educational needs to apply planning. Consequently, the articulation between the two professions must undoubtedly suffer many impasses before ideal coordination and cooperation will occur. Even the responsibilities for establishing this communication and the possible outcomes have not been determined by precedents, making the objectives and goals tenuous.

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A further specific problem to efficient dialogue is that of the translation of an educational technique to a building. Too often, either functions specified in educational objectives have not been built into buildings, or else have been built in with too many restrictions. Unfortunately, an educational function may become obsolete in this age of increased knowledge, and a constriction in providing for this obsolescence can become a built-in hazard to architectural-educational planning.

The planning of architectural and educational designs by experts rather than practitioners has long been felt a deterrent to creativity. Consequently, lay opinion and ideas in the design of the educational facilities of the procurement of lay ideas in its content, it hoped to set the atmosphere for such communication at a later date.

Avoidance of the danger of architectural and educational planning for only the staff, rather than the children, must be met by objective comprehensiveness and multi-faceted approaches. Once again, the vital use of children in design planning and research is emphasized.

The lack of adequate theory clearly delineating either curricular or building goals is another problem to be faced both in architecture and in education. As an example, no definitive theory or research has adequately evaluated the value of classrooms for atypical children which are either integrated or nonintegrated with normal children.

The nature of special education requires that problems of design be concerned not with specific educational function for all children, but rather with specific overall curriculum goals to be obtained in a specific classroom with a specific group of children. The employment of this latter concept should embody flexibility of function and multiple uses of various design components.

Economy is another practical problem faced in the articulation of architecture and education. It is postulated that many excellent architectural innovations will often be discarded because of factors of immediate financing. Hence, it behooves not only the architect but the educator to determine long range economic feasibility and relate such feasibility to the overall educational goals of each child and his surrounding society.

In summary, the seeming needs and problems of the architectural-educational dialogue indicate a unique type of thinking concerning educational and architectural problems. Perhaps a new discipline is necessary to effect conversation between two traditional disciplines. Yet it is suggested that before our culture begins to train "edutechturalists," it must support joint meetings of both architects and educators to produce a learning conversation so that "experts" emerge with clear and concise knowledge of both disciplines. Only when the two disciplines can understand each other's needs, problems, goals, handicaps, and aspirations can mutual cooperation produce widespread progress.

III. Need for Research

The theoretical solutions to the general and specific needs derived from architectural and educational dialogue must of necessity involve a professional who is highly research oriented. Only with a continuing quest for "if--then--" statements and antecedents to

"because" statements can architects and educators attempt to build a foundation for innovative, creative, and effective educational plans. It is with this research orientation that theory must be built, tested, revised and reformulated.

There are significant areas of exploration which will allow the architect greater opportunity to complement the traditional intuitive design function with substantive information. The most pressing question seems to be whether through a conscious manipulation of the environment the designer can change or reinforce the patterns of activity which a special education facility is expected to house. In order to accomplish this it must first be determined what those are and in what ways they can be stipulated in precise terms.

A great deal of confusion exists in understanding the position of the architect in the design and construction of the types of facilities that were discussed. Broadly stated, the problem appears to be one of transcribing information, prevailing attitudes, and traditional predispositions into meaningful and substantive building. The design parameters, then suggest a multi-disciplinary orientation with the architect functioning as translator of the verbal goals stated by special educators and behavioral scientists. Moreover, there is a need for accurately measuring the activities in which the children and teachers are involved, a careful description of curricula in terms of these various activities, and further speculation concerning possible manipulations of the environment in order to achieve more effective and efficient use of space.

After the assumption is made that certain design variables can reinforce the teaching or learning situation, it was suggested that specific kinds of equipment be investigated as to their feasibility in design. For instance, the blackboard suggested many uses not presently considered integral with its design: A blackboard on which children can draw while sitting on the floor, lying down, or standing up, and one which the teacher can use simultaneously was discussed as one relevant item, and methods for applying it to the classroom were also mentioned. It was also made clear by the architect that hardware is presently available to position this simple teaching tool in a way such that it can be used by children in any posture. Other transparent and translucent materials are available for use with wax composition crayons, chalk, poster paint, or adhesive materials to describe the work of the children. The discussion of blackboards, or chalkboards, generated further discussion concerning surfaces in general for wall and ceiling.

The most obvious research-oriented solution to the aforementioned problems and needs is embodied in an experimental building. Previously, experimental buildings have been conceived but have not shown outstanding success because the experimentation carried on in these buildings has been inadequately sophisticated and because the research design allowed for a multiplicity of confounding variables. An example of this type of research is that done with windowless classrooms, showing that such buildings are not significant accelerators of academic, cultural, or social achievement.

The design of any experimental building should maximize the possibilities of research of both basic and applied nature. Such experimental buildings, in other words, should not merely measure, for instance, the effect of a change of wall upon academic achievement, but should attempt to measure motivation, learning environment, and other conceptual terms not yet operationally defined. The teaching-learning process per se should be

investigated within the confines of the proposed experimental building.

The experimental building should also include possibilities for new technological innovations. Because technological innovations include developments not yet invented, today's innovations can become tomorrow's memory. However, "science fiction thinking" and extensive doses of imagination may help to prevent needless waste and inefficiency caused by this obsolescence.

Finally, any good research should provide avenues for dissemination. Such dissemination should include activities of a public relations nature, which would attempt to "sell" school boards and the general public on innovative types of educational-architectural planning, and to overcome "traditional attitudes" of conservatism. Such public relations and dissemination activities could further promote wide field testing of architectural and educational ideas, and effect broad applications of research principles to pragmatic methodology.

Possibilities for such research exist at the present time. Under Public Law 88-164, a center for research and development in special education will be established. Such a center could employ architectural and educational design to effect the aforementioned research-oriented problems. Further research conferences such as the one being described could add immeasurably to the theoretical and practical solution to problems. A compact of schools building special education facilities, paralleling the School Construction Systems Development project in California, could allow field testing of experimental centers. A full knowledge of increased technological developments and building materials and accessories would keep architects and educators informed of possibilities. The establishment of values and priorities in building, goals, and expenditures could be developed through conferences. Further, a "problem-oriented" approach through conferences could establish guidelines for planning, structure such planning, and assure consideration of all details.

A word of caution, however. The tradition of relying upon research-based models cannot always be considered adequate in view of the innovations possible through the joint efforts of education and architecture. Further dialogue between the two disciplines must inevitably invent or create. Future communicational patterns must, of necessity, also assume the form of sessions in creativity and "brainstorming", rather than dependence upon research results.

IV. Parameters for Research

A. Foundational Questions

To produce adequate design, the architect must ask certain questions of the educator. To effect meaningful education, the educator must answer these questions. This conference demonstrated that the questions were easier to ask than to answer, not only because there is an inadequate body of educational knowledge, theory, and research from which to draw meaningful implications, but also because the answers need to be flexible to different groups. It should be kept in mind, then, that these questions must be asked with regard to each different educational grouping, each age level, each disability level, and in each geographical region. Some of the primary foundational questions forming the basis of

practical dialogue are as follows:

1. For whom are we designing? What are the demographic and educational characteristics of the group for whom the educational plant is being built? What are their primary disabilities? What are their strengths?

2. What are the goals for this group? Are educational and societal goals the same or different? If so, in what way? Can these goals be effected? What are the best methods for obtaining these goals?

3. What is the child's immediate environment and personal needs?

4. How can the environment be manipulated to reach the aforementioned goals?

5. What are a child's primary variables of interaction? Do they differ from time to time? If so, how? What are his secondary variables of interaction?

6. How can we form an educationally sound interaction of children, teachers, curriculum, and environment?

7. What provisions can or should be made for parents?

8. What is the developmental process? When should changes occur to reflect development? When, for example, should doors be supplied with doorknobs rather than pulls?

B. Flexibility

Flexibility in teaching and learning spaces for special education purposes has two meanings. First, the use of a single space for more than one purpose without changing its geometry. This might mean moving children from one furniture grouping to another within the same room. The other suggests the physical manipulation of the space in order to provide different visual environments for a variety of classroom events. Within these two broad categories the characteristics of flexible, static or dynamic physical environment can be further defined.

The description and evaluation of the flexible classroom systems is subject to empirical judgment since little research has been undertaken in this field. Although it was assumed that there is a significant behavioral result from changing the surroundings, there is no agreement as to the magnitude or mode of such environmental changes on the children. However, it is known that retarded or emotionally disturbed children adjust more slowly to changes in the environment than normal children. This factor alone may have an effect on the architecture. Rapid shift in the classroom organization takes many forms, and the time and personnel necessary for accomplishing these changes becomes a factor in describing flexibility. The complexity of the cue change caused by environmental manipulation raises some basic questions. What is the child's capacity for change in a time span? And, is it possible to equate the speed and magnitude in a changing environment with the productivity of the students? The answers to both of these questions

again will require research and evaluation.

There are four possible methods for changing teaching spaces. First, the teacher can restructure the classroom for short periods of time. Second, the child may change parts of the classroom also for short periods of time. Third, the maintenance department of the school system may make more substantive changes that would be used for longer periods of time. And last, an outside planning agency may make complex changes. Such changes directly relate to the curriculum which should be made known to the architect prior to the design of a new facility.

The uses of flexible space should directly relate to:

a. Curriculum sequence

b. Behavioral changes in the child

c. Measurement techniques as to rate of change in learning or social behavior.

Additional resource personnel, either classroom assistants or master teachers also reflect flexibility in the teaching space. Additional areas for ancillary staff should be provided and the innovative abilities of the teacher to realize the potential of the teaching area may be partially helped by either the classroom aide or a master teacher visually or in voice communication with the teacher.

Since each child progresses at a different rate, it is possible to equate his progress with a series of known criteria. One such criterion is the ratio of children in the class to the teacher. It has been suggested that the classroom be designed to provide spaces for one, two, four, eight or twelve children depending on the individual child's capability for group participation in learning or training. Individual or small group methods have proven useful in training children with certain types of handicaps and this factor also should be taken into consideration in the design of flexible rooms. An order of preference for the most needed and used spaces must therefore be developed.

Some general criteria for flexible teaching and training spaces are:

1. All visual parameters of the movable elements should be easily and rapidly changed. This will allow the visual environment to become more complex over a period of time and in relationship to the child's capability for coping with it.

2. Flexibility should be both internal and external: Rooms with static limits would be changeable internally - subdivided, made simpler or more complex. Rooms adjacent or in close proximity to one another could be coupled or reorganized into one larger space.

3. The addition of teaching machines, visual and auditory aids, data collection and distribution devices as well as immediate viewing equipment such as two-way mirrors should be included as an integral part of the architectural design.

4. Flexible furniture and equipment such as multi-use desks and chairs,

display boards and storage units should reflect both curriculum needs and the various spaces in which they might be used.

C. Furniture, Materials, Hardware and Teaching Equipment

One cannot remain indifferent to the lack of furniture and equipment designed to be compatible with special education facilities. Although teaching machines are coming into use in special classes, the notion of multisensory input devices as part of the design scheme is not often pursued. Rather, the equipment is applied in arbitrary ways to the spaces allocated for various activities without regard to the way it might be used. Furniture and hardware, then, are not considered to have any intrinsic education or training value when in actuality they play a major part in how information and ideas are distributed and are not, as frequently assumed, merely cosmetics applied to the finished product.

For instance, posture is in a sense a training vehicle and body position will necessarily change as the task in which the child or teacher is involved varies. The position for painting might be different from the position for listening, and in turn various games are played in sitting, standing and semi-standing positions which can be partially reinforced through the use of chairs and tables suitable to the activity. It is also possible that an activity such as listening to music can best be accomplished on the floor. Then the floor might be designed to make sitting posture more comfortable for long periods of time, allow for the use of floor easels, flat drawing pads, games, etc. Tables, chairs, easels, blackboards, teaching machines, audio-visual equipment, physical fitness devices and even crayons and other materials should have compatible uses in the overall sequence of classroom activities.

The task of orientation of some teaching and training programs for impaired children lends itself to basic functions such as grooming, personal hygiene, housekeeping on one scale and to recreation on the other. There is an easily recognized difference in the areas in which these activities will go on, but it is not as yet known how much space is actually required for these tasks or how equipment may be used to expedite or make more efficient the cognitive response of the children. A mirror, properly placed may perform many functions such as a reminder of where the child is located, a time element, or as a visual game. A door may be just a barrier, but also it may train a child in the operation of hardware, it may be a surface on which objects are drawn or where a permanent cue to place or direction may be indicated. Its size, color or position, method of operation, type of lock or other hardware, texture or weight may also be design considerations indicating such things as privacy, or what may occur behind it.

Although a door may have a primary function as a barrier, other designed objects in a space may have a series of parallel functions. It should be a pre-determined judgment of the architect as to the functional reliability of all components of a space if the possibility exists that they might be used for a teaching or training purpose.

D. Information Transmission

The available information collection and transmission equipment suggests an investigation as to which of these systems presents the best and most efficient way of helping

teachers and researchers to evaluate children's behavior and the feasibility and usefulness of teaching methods. Since ongoing evaluation of the child's progress is usually part of the training process, more accurate methods might be determined for collecting meaningful information if the systems could be equated with the teaching program and in turn these methods appear as part of the architectural concept.

Various types of equipment were discussed, all of which seem to have bearing on the design and planning process:

1. Audio tape
2. Video tape
3. Still photographs
4. Motion pictures
5. Two-way radio.

The preceding are considered information input categories and were discussed as part of a more general pattern of both observation components and information input. The system should be included in the program since in the case of special education, the ongoing evaluation procedures should be integral with the teaching and training program.

Information output devices also include most mechanisms capable of producing visual and auditory signals using the same media as the input equipment. The potential uses of computerized information may be related to both in organizing the program in both the architectural and teaching contexts.

Transmission interaction must take into account various configurations of events: teacher-child (individually and in groups), child-child (also singly and in groups), teacher-master teacher, teacher-assistant teacher, classroom activities-observers. Included in the information transmission plan must be the capability of introducing control, information or the observation potential into ancillary spaces adjacent to or actually a part of the classroom complex. For instance, visual control of storage areas, administrative spaces, observation spaces and lavatories. An order of precedence in terms of equipment and use should be developed.

If it is determined that information and control can be partially accomplished through mechanical means, then the teacher can more efficiently utilize her time of teaching and the children may be partially relieved of periods of non-activity or boredom.

Another problem arises in designing multiple input channels that allow differentiation by both teacher and child. The complexity of operating these devices must be related to the relative difficulty of the task to be undertaken. This question must also be taken into consideration in developing the program.

V. Suggested Educational Needs - Suggested Architectural Solutions

Throughout the conference, many educational needs were stated. Sometimes these needs fit a theoretical educational conceptualization. Sometimes they did not. Consequently, it was felt that a listing of separate needs and their possible architectural innovations should be listed in an itemized fashion. This listing would facilitate the use of such needs as reference points for decisions concerning various desability groups, learning syndromes, or conceptual frameworks of learning or methodology. The educational needs and their architectural counterpoints are as follows:

A. Many exceptional children will have a need to displace hyperkinetic energy. This must be done without disturbing other children, the teaching process, or the teacher. Small rooms or quiet areas adjacent to a central work area is a suggested answer to this need.

B. Many children exhibit continuous verbal negative responses which need extinction. In other words, there must be some control for excessive yelling and screaming by children. Architectural solution to this problem would include rooms that mask or damp noise considerably, the use of sound equipment and/or the building of withdrawal and isolation areas, which avoid the spread of "noise contagion" or interrupting behavior.

C. The teacher needs to be free from mechanical and non-teaching activities. The obvious answer is, of course, teacher aids. However, teaching freedom also requires easy access and manipulation of auditory and visual materials, room space, and any mechanical adaptation of the environment or the educational process.

D. The four dimensions of architecture which may provide a sound base for manipulation to meet educational needs seem to be flexibility, mobility, multiplicity, and safety. Of these concepts, the construct of flexibility as a "large number of variables available to solve each individual problem" seems to express that dimension of architecture most innovative to the process of architectural-educational planning. Flexibility of space may be attained by teacher-controlled wall and ceiling movements, a loft area or subterranean area or large movable cabinets or wall enclosures in which aids, materials, and furniture may disappear when not in use, different uses of three dimensional space, and indoor-outdoor flexibility. The use of air walls, various acoustical materials, differing fabrics and textures, and multiple lighting possibilities, may create incredibly flexible and variant possibilities for space adaption.

E. Although not always intrusive behavior, "talking-out behavior" must customarily be silenced to retain the adequate attention span of the entire group. Consequently, individual masks, separate carrels, or sound-absorbent materials in space could be employed to eliminate such behavior.

F. A teacher, as a human being, has a need to withdraw from her class and pupils occasionally. A teacher's office with adequate vision of the class, yet an insurance of privacy, is an absolute necessity for efficient and adequate working conditions.

G. It was universally agreed that there should be an intimate relationship between the curriculum and the physical plant. Since curriculum is generally meant to reflect the development of a child intellectually and physically, it was concluded that the child's environment must also reflect this development. Consequently, individual rooms which

grow with the child and the group to form larger group rooms seemed necessary. Furthermore, such rooms should be equipped with developmental mechanics, such as hardware which may be moved up the wall or expanded to meet physical growth. Physical arrangement of special classes should reflect the growth from individual instruction through small groups to much larger public school classes.

H. Many programs in special education will necessarily be itinerant. Although the problems of itinerant classrooms are numerous and great, it is entirely conceivable that a travelling teacher may be able to someday transport her classroom with her. Consequently, architectural planning in the future must deal with that type of structure which may be totally or partially portable and as utilitarian and functional as any other type of specialized structure.

I. Many children need feelings of physical security. Although psychological security can be given by the teacher, it has been noted in psychological-architectural research that small rooms tend to produce a feeling of safeness and security in young children -- "womb-rooms." Consequently, a room capable of being scaled down will effect this security as will a cloistered room available to the child on an individual basis.

J. It is universally agreed that teachers must be specially trained to use the new architectural and educational innovations which will undoubtedly occur. Consequently, facilities for the functions of teacher training and teacher education must occur in new buildings. It is presently felt that this is best accomplished by observation rooms adjacent to the classroom where a master teacher may effect radio communication with the practice teacher but is, himself, not viewed by the class. Indeed, the radio communication must be made to the student teacher via visually unobtrusive receiver-earphones. Great research success has been shown in this methodology of teacher training.

K. Most authorities in special education would give consensus to the idea that most exceptional children need individual instruction, at least in the early or formative years of special education. Consequently, all space must be convertible to individual space as necessary, either through the aforementioned cloisters, study rooms, or adjacent facilities. However, the use of space for different disability groups must differ, as the mentally retarded child must "overlearn" and the neurologically impaired child must be free from "distracting or extraneous stimuli." Heterogeneity of grouping must be responded to by individuation.

L. Many exceptional children have needs for space in which to socialize and to interact with each other. A circular classroom which included flexible adaptations for individuation may encourage this socialization process. Further, socialization rooms such as waiting rooms or recreation rooms may be also used.

M. Many uses were found from rooms adjunctive to the classroom. It is quite possible that certain adjunctive rooms can fit all specific needs such as observation, individual tutorial sessions, teachers offices, offices for experimenters, "quiet rooms," reception rooms, or adjunctive play rooms. The use of single or several rooms for multiple solutions to needs presents, of course, the problem of mechanical facilitation and removal of certain materials, the solutions of which have been discussed in previous sections.

N. Many exceptional children have needs to be routinized to the point of allocating certain spaces in rooms with certain functions. Thus a reception room may serve as "quieting room" before entering the class each day. Furthermore, a corner of the room may be designated as a mathematics study room, and always be used as such. It is felt that the same area can be used with multiple functions but can be changed by the use of lights, different shapes, movable walls, and the like. All such rooms should work with the four variables of space, lighting, acoustics, and accessibility in determining the differential functions of its section and of its whole. Children have differing curriculum needs requiring various equipment. It is suggested that there be separate spaces for tutoring, and it is further suggested that each of these separate spaces have individualized equipment. Closed circuit television with separate switches for visual and audial input and output would allow individualization of curriculum, using novel and helpful sensory channels. Recording equipment needs to be used in many classrooms and should be easily accessible and usable.

O. Research also dictates that specific technical materials be built in a room used for research purposes. In order to determine classroom movement and reaction, micro-switches need to be imbedded in the walls and the floor. Chair switches can signal the teacher and record other types of data. Voice-activated recorders, either remote-controlled or manual, may be needed. Pre-wired panels for multiple microswitches under nylon carpeting to track children's movement may facilitate research of the future. Ceiling loop transmission antennae will promote better accoustical equipment for hard-of-hearing children in walkaway units or for future student teacher coaching. Numerous 110 AC outlets will be necessary for electrical equipment. Many channelled tape recorders will be necessary for recording not only audially but visually through videotapes, etc. And, central recording will be necessary for the preservation of data. It may be necessary to route many channels of recording into analog computers for scanning and pattern perception as well as for immediate feedback.

P. Since space will often be shared for larger groups, it may be necessary to connect two or more classrooms. Consequently, equipment will have to be connected between classrooms. This may necessitate liftout ceiling troughs for the pre-wired connections of certain types of research in teaching equipment.

Q. It is felt that many children need a quieting period before the learning session begins. Consequently, a reception room might be a necessity. Such a room should be small and intimate, non-stimulating, geared for temporary or short-term occupancy, and should be a different space from that used for the learning process itself.

R. Recent research has shown that immediate feedback is most desirable to facilitate learning. Consequently, learning carrels may be employed with automated devices for immediate feedback. Such carrels do not necessarily mean "teaching machines", but rather machines which may be programmed at will by the teacher.

S. In research, as well as operant conditioning methodology and other forms of teaching, a teacher often needs to know frequencies of certain types of behavior. Such behavior must often be tallied by a student or observer. Consequently, built-in circuitry to facilitate tallies of frequency by an observer in a viewing room with feedback to the teacher would be necessary. It is suggested that an electrical counter that could be

plugged into the wall of the viewing room and connected to a screen in the classroom visible only to the teacher would effect most ideally this frequency counting.

T. Although toilet training is often a problem with many exceptional children, the modification of toilet rooms has been infrequently considered. However, toilets and bathroom facilities must also meet the criteria of developmental progression. Consequently, it is suggested that toilets be adjustable in height and complexity of operation. Furthermore, they should be movable and variable in entrance to reflect the development in use from "adjacent to the classroom" to "down the hall" use.

U. Many children, as well as exceptional children, have a need to experience aesthetic pleasure both tactually and visually. Consequently, an outdoor garden with statuary and artistic objects may influence the development of aesthetic appreciation. Various textures can be used in the indoor-outdoor facilities, which cannot be used in the indoor classrooms alone.

V. Display of student productions is a device to build motivation through positive reward. Consequently, an ideal classroom should consider the extensive use of display space for exhibiting. All surfaces should be available, including those surfaces found on the top of cabinets and parallel to the floor. Such surfaces should not be easily marred and should allow for the display of three-dimensional objects as well as written and drawn productions.

W. Scheduling of classes and individual students within classes for various activities throughout the day has long been a deterrent to ideal curricular goals. The use of the "fifty minute subject hour" or the "reading time" has taken very little account of individual readiness, differentiated rates of learning, or physical or psychological conflicts. The resulting solution to these needs is, of course, complete individualization or the flexibility necessary to effect this condition. Only when the environment, teacher, and curriculum can adapt to meet specific educational needs and characteristics of specific children can scheduling become unnecessary and irrelevant as a deterrent to the attainment of education.

VI. Research Conference Follow-up - Consequent Building Designs

Following the conference reported here and as a partial result of the ideas generated, a complex of buildings was designed to house educational, medical, psychological, and diagnostic services for the handicapped and gifted children of Mower County, Minnesota. The suggested plans reflect the attempt of the architect to capture in the building design the potential for implementing the educational innovations that were suggested by the conference participants.

If the conference were evaluated to identify its single most mentioned emphasis, it would most certainly be the suggestion that maximum flexibility of all types must be a mandatory consideration in designing school buildings for exceptional children. This flexibility regards primarily giving the <u>teacher</u> the opportunity to create spaces designed for different functions, numbers of children, children of different ages, and teaching equipment. The construct of space flexibility is not restricted to the interior of the building, but extends to the total dimensions of the school which, with minor modification,

can be increased or decreased in size or altered in shape.

A keen awareness of the need for flexibility was evidenced in both of the above aspects in the architectural drawings. The design of all the buildings employs the modular concept. Such an approach permits rapid restructuring or adding-on to the existing buildings. It is possible to increase the size of the basic pavilion by adding 60 x 60 units with a minimum of difficulty. Further, the mechanical outlets and electrical grids are included in the prefabricated octet trusses which permit the rapid connection of new and already existing units. Provision is also made in the basic ceiling design to allow for the relocating of all air conditioning and heating ducts as the requirements of the area they serve are altered. Since these units are designed to serve a semi-rural northern region, the need for adapting the buildings to the changing needs and climate of the area is obvious.

The use of the modular design is extended into the classroom units. The classroom teacher or the children themselves rapidly change the basic room space into a series of smaller or larger areas. A typical room in either the building for the educable mentally retarded or the crippled children consists of four small "U-shaped" areas placed on the corners of a larger square-shaped room. By moving easily-sliding panels the fourth side of the "U-shaped" areas can be closed off to form an isolated space. The utilization of these panels permits the creation of a maximum of five independent spaces which can be utilized simultaneously for a variety of purposes. In addition to the mobile panels to adjust vertical space, adjustable ceilings provide for the alteration of horizontal space.

Beyond using the panels and ceilings to create new physical spaces, provision has been made to utilize both natural and artificial light to create new "psychological spaces". A number of windows and an overhead skylight in each room permit utilization of the maximum amount of daylight. Additionally, a centrally-suspended electric light unit provides for directing single or combinations of lights into various room areas. This is not restricted to white light, but includes colors as well. The control of this unit is given to the teacher through a switch series allowing for the maximum manipulation of this light. Display space is increased because both sides of each of the panels can be used for this purpose. Additionally, individual temperature and humidity controls permit the further individualization of space depending upon function and population number. The rooms are acoustically engineered to reduce noise. To encourage the use of all space, all floors contain panel heating permitting their use even during winter weather.

Some concern was expressed during the conference regarding the provision of bathroom facilities based on children's developmental cycle. As a result, bathrooms at the pre-primary and primary units are designed as an integral part of the room, which allows for speed of action on the part of the children and maximum supervision by the teacher.

Because of the limited number of classroom units in each building, it was possible to include in the basic design the elimination of the majority of corridors which were generally considered by the conferees as expensive and limited in use. Space to store coats and boots and for casual conversation was provided as part of an entry alcove to each room. The small entry areas would also serve to define to the children that the rest of the room area was only for learning.

Since this facility has been designed to provide opportunities to develop in-service training for local personnel as well as pre-service training, and diagnostic and research experiences for affiliated university people, maximum avenues for observation have been included in the design. One-way viewing screens provide for immediate observation while through the provision for television and video tape screening, large numbers of people can observe classes, diagnostic sessions, demonstrations, and therapy both at viewing stations in the school and at universities. Provision for all necessary sound equipment has also been included in the plan.

An examination of the design of these buildings indicates that not only are they architecturally functional but they encourage the educator to use the building to experiment in the education of exceptional children. While it is apparent that the architectural-educational conference has produced meritorious and workable ideas, it must be symbolic of only a "romantic fling" of the two disciplines and must be followed by "courtship" and "marriage" in order to conceive further ideas.